

Center Offices Created For Apollo Applications

NASA has announced the establishment of new program offices at MSC and Marshall Space Flight Center (MSFC) to handle the increasing level of activity involving Apollo applications.

The new program offices are responsible for management of Apollo applications program activities at the respective centers.

Dr. Robert R. Gilruth, Director of MSC, named Robert F. Thompson as Assistant Program Manager, Apollo Applications Program Office at the NASA Houston field center. George M. Low, Deputy Director of MSC, will serve as Acting Program Manager in addition to his present duties. Other key personnel will be named later.

Hammack has previously served as Deputy Manager of the Office of Vehicles and Missions in the MSC Gemini Program Office.

Dr. Wernher von Braun, Director of MSFC, named Leland Belew as Program Manager and Stanley Reinartz as Deputy Manager of the Office Apollo Application Program Office, at the Huntsville Center. William D. Brown replaced Belew as Manager, Engine Program Office.

The new program offices have been established at the same organizational level as other center program offices and will operate in the same manner.

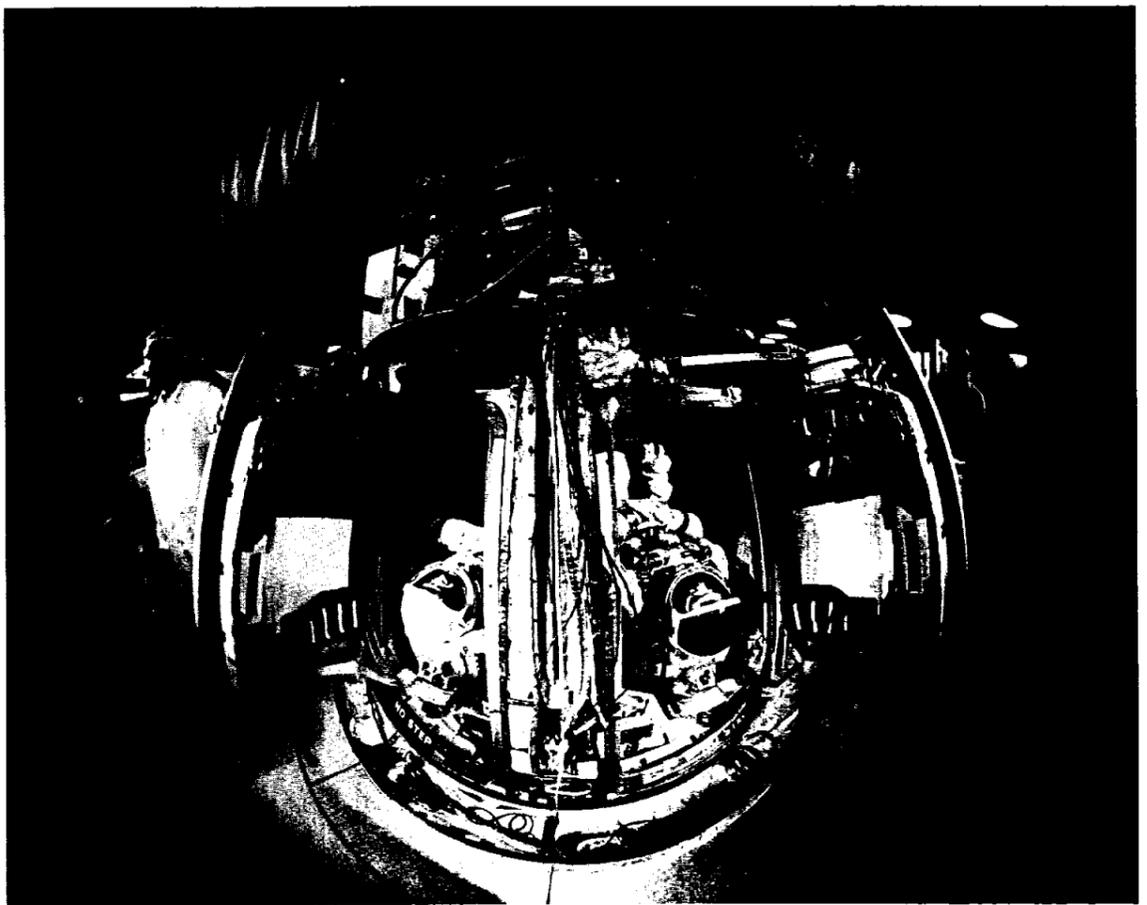
Gemini X 'Firsts'

- New manned altitude record of 413 nm. (previous record: USSR *Voskhod II*, 268 nm)
- First mission with two EVAs.
- First mission to use target vehicle for maneuvering thrust.
- First double rendezvous — Agena X and Agena VIII.
- First mission to achieve in one flight all of the basic objectives of the Gemini program: rendezvous, docking, combined vehicle maneuvering, extravehicular activity and controlled re-entry

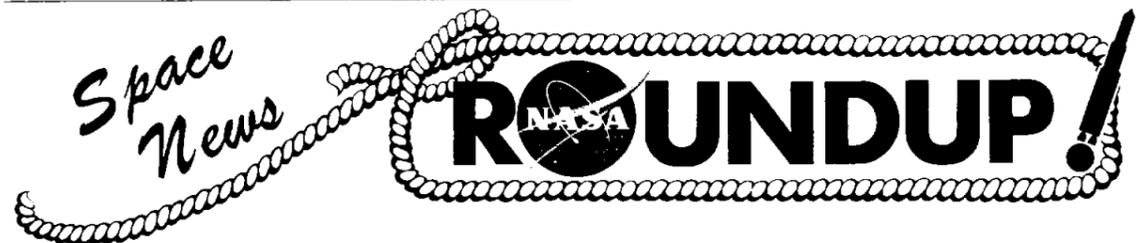


Robert F. Thompson

Thompson was previously Chief of the Landing and Recovery Division and directed NASA planning, development and implementation of the landing and recovery operations in the Mercury, Gemini and Apollo manned space flight programs. Jerome B. Hammack will replace Thompson as Chief of the Landing and Recovery Division.



GEMINI X ON WIDESCREEN—Gemini X prime crew John Young and Michael Collins are the least distorted figures in this ultrawideangle photo of the Gemini X spacecraft in the Launch Complex 19 White Room made during the Gemini X Simultaneous Launch Demonstration.



VOL. 5, NO. 20 MANNED SPACECRAFT CENTER, HOUSTON, TEXAS JULY 22, 1966

Gemini X Topples Records, Achieves Basic Flight Goals

The faultless countdown of Gemini X and its Agena rendezvous vehicle to on-time liftoffs seemed to have set a trend for the rest of the mission. Except for crew eye irritation from an as yet unexplained toxic substance in the spacecraft suit circuit which cut short the stand-up extravehicular activity and a low quantity of attitude control fuel which caused umbilical extravehicular activity to be shortened by several minutes, the Gemini X mission was completed without according to plan.

At *Roundup* press time, Gemini X was scheduled for retrofire at 2:31 pm CST yesterday for landing some 35 minutes later in Area 44-1 in the West Atlantic.

Among Gemini X's accomplishments was a dual rendezvous with two Agena rendezvous vehicles using the primary propulsion system of the first vehicle after docking to set up the orbital conditions for rendezvousing with the second vehicle. The combined maneuvering of Gemini/Agena X was the first time in spaceflight history that a manned spacecraft has accomplished orbital maneuvering through power supplied by a second vehicle, setting thereby a new manned spaceflight altitude record of 413 nm. Gemini X is also the first mission to have two periods of extravehicular activity.

Pilot Michael Collins twice opened the hatch to the hard vacuum of space to further explore manned operations outside the spacecraft and to conduct experiments.

Exact Timing

Liftoff of Gemini X was precisely on time at 4:20:26 CST to place the spacecraft in the proper phasing with the Agena X which had been launched at 2:39:44 CST and in proper relation to Agena VIII. Both launches were nominal and the systems aboard both spacecraft functioned

smoothly throughout the mission. Cutoff velocity was 25,711 feet per second and an adjustment spacecraft thruster burn of 27 feet per second was added after insertion.

A series of maneuvers by the crew of Gemini X placed the spacecraft within visual contact of Agena X by 4 hrs 26 min after liftoff and docked with the Agena at about 5 hrs 50 min after liftoff over the Pacific southwest of Hawaii. Gemini X's thruster fuel remaining after the rendezvous maneuvers was some 380 pounds instead of the pre-mission estimate of 680 pounds, and flight planners in Mission Control Center-Houston immediately began shuffling experiments to optimize usage of the fuel left.

'Really Something'

Over Hawaii at an elapsed time of 7 hrs 38 min the 16000-pound thrust engine of Agena X's primary propulsion system was fired to boost the combined vehicles into an orbit with an apogee of 413 nm to set a new altitude record for manned spaceflight. The earlier record was 268 nm set March 18, 1965 by USSR's *Voskhod II*.

"That was really something," said Gemini X command pilot John Young as the burn was completed. "Pretty wild, huh?" replied Hawaii spacecraft communicator Ed Fendell. "When that baby lights," said Young, "there's no doubt about it!"

(Continued on page 2)

Lunar Orbiter to Snap Photos of Surveyor I

Modifications to the flight plan of next month's Lunar Orbiter mission will increase the likelihood of its photographing Surveyor I on the lunar surface northeast of the crater Flamsteed in *Oceanus Procellarum*, (*Sea of Storms*).

Launch of Lunar Orbiter is planned within the period of August 9 through August 13.

Lunar Orbiter's high-resolution photography on these two successive orbits will provide stereographic photos with a resolution of objects as small as three feet across.

Before contact with Surveyor I was lost at lunar nightfall July 13, its solar array and high-gain antennas were positioned to form the largest possible shadow on the lunar surface. The technique will aid Lunar Orbiter photography of the Surveyor site at 43° 34' West Long. by 2° 41' South Lat. Since landing June 2 Surveyor has sent back to earth thousands of closeup photos of the moon's surface.

The first seven previously-announced Lunar Orbiter photography areas remain unchanged, but to cover the Surveyor landing point it was necessary to shift the original Site 8 slightly north to a point at 3° 00' South Lat.

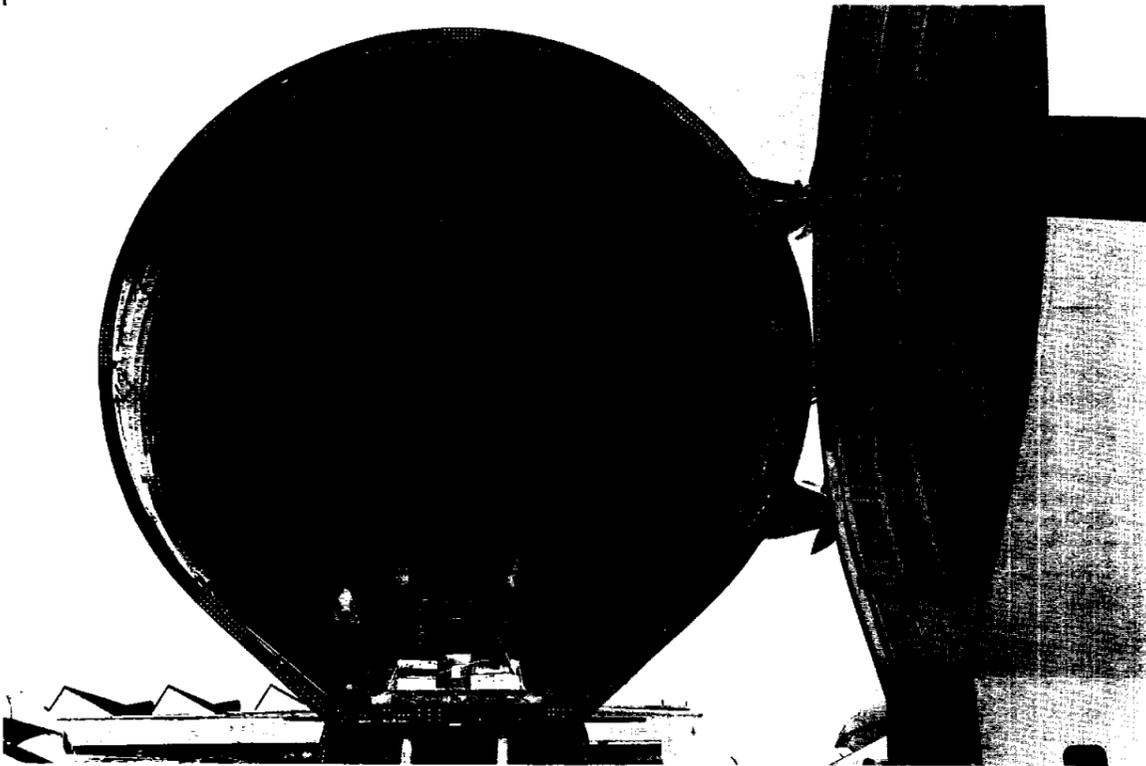
by 36° 30' West Long. Site 9.1, Surveyor's landing point, is one degree south and slightly east of the original site and covers the rim as well as the floor of the ancient crater in which Surveyor landed.

The Lunar Orbiter project is managed by the NASA Langley Research Center.



FOCAL POINT—The Flight Director's console, manned by Gemini X prime flight director Glynn Lunney, was the hub of mission flight control activities during Monday's launch of Gemini X. The image of the liftoff on Lunney's television monitor, as of *Roundup* press time, was the only liftoff photo available, since on-the-scene photos en route to MSC were stranded in Atlanta because of the airline strike.

Jonah Gemini



SWALLOWED SPACECRAFT—Gemini XI spacecraft seems to rattle around in the hold of the "Super Pregnant Guppy" aircraft as it was loaded July 6 at McDonnell for shipment to Kennedy Space Center. The spacecraft arrived at KSC the following day and was taken to the Manned Spacecraft Operations Building for pre-mating checkout.

MSFC to Manage Apollo Applications Telescope Mount

NASA has assigned project management responsibilities for the Apollo Telescope Mount for Saturn/Apollo applications missions to Marshall Space Flight Center.

The Apollo Telescope Mount (ATM) is presently conceived as a combination of solar-oriented telescopes capable of high resolution and fine pointing accuracy. It would be attached to the Apollo spacecraft so that an astronaut observer could contribute manually to the automatic sun-centering system. It would aid in selecting and focusing upon an area of particular interest on the sun.

NASA will use "phased project planning" for ATM; that is, a decision to begin hardware development will await completion of the preliminary design phase and recommendations by MSFC.

A number of scientific investigations have been proposed by solar physicists for ATM missions. Types of instruments to make these investigations include:

- large x-ray telescopes capable of making high-resolution images of the spectra and characteristics of solar flares;
- ultraviolet spectrometers and spectroheliographs which could record the spectrum of small precisely-defined regions of the sun's atmosphere;
- coronagraphs designed to study the changes in the solar corona near the sun.

Initial ATM's are planned to be mounted on the spacecraft for earth-orbital Saturn/Apollo applications missions. The first ATM mission may be flown in the next period of maximum solar activity which will begin in late 1968 and continue for several years.

Shortly after the Agena engine burn, the crew went into an eight-hour sleep period at 1 am Houston time.

Additional burns with the Agena's big engine on the second day placed Gemini X in the proper phasing with the Gemini VII Agena from which Michael Collins would retrieve a micrometeorite experiment package during his umbilical EVA.

Stand-Up EVA

Cabin depressurization and hatch opening for Collins' stand-up EVA took place at an elapsed

ZIA Corp. Picked For White Sands Maintenance Pact

NASA has selected ZIA Corporation, Las Cruces, New Mexico, for negotiation of a contract covering maintenance and operation for the White Sands Test Facility.

The cost-plus-award-fee contract is for one year at an estimated cost of \$5 million with a provision for two additional one year-extensions. The contract will go into effect during the fourth quarter of calendar year 1966.

Under terms of the contract, ZIA corporation will provide maintenance and repair to buildings, roads and grounds, mechanical, electrical and utility systems, equipment and test facilities. In addition to repair and operation of the altitude simulation facility and cryogenic, propellant and storage facility, the company will also provide miscellaneous services as transportation, mail, dispensary, fire protection, communications and custodial.

The ZIA Corporation was one of four firms that submitted proposals on May 9, 1966.

Gemini X Topples Records

(Continued from page 1)

time of 23 hrs 27 min over the Canary Islands tracking station. "It's really a beautiful view out here," said Collins as he stood in his seat attached to a short tether.

"Body positioning has been absolutely no problem," he continued in his conversation with Houston Spacecraft communicator C. C. Williams re-moting through the Tananarive station. "As a matter of fact, I sort of have to struggle to move up or down in the hatch. The suit is pressurized and fills the available space with plenty of points of suspension."

Stand-up EVA was cut short when fumes in the spacecraft environmental control systems caused the crew's eyes to water to the point where they could not see.

Further maneuvers the next day using the Agena's engine and the Gemini thrusters after undocking brought Gemini X to within a few feet of Agena VIII and to the planned time of Collins' umbilical EVA. Collins retrieved the micrometeoroid experiments package from Agena VIII.

A low level of thruster fuel remaining caused the umbilical

Nelson Places First In Individual Bridge

Don Nelson won the 1966 MSC Duplicate Bridge Club Individual Championship, with Al McReynolds second, and Gail Kimball third.

Winners of the June 28 Club Master Point were Howard Leap, Jr. and Dale Parker, first, and Tom Holt and Charles Filley, second—North/South. East/West winners were Norma Dreszer and Gail Kimball first, and Barbara Castanias and Evelyn Schramm second.

John Herrmann and Paul Swanzy won the June 22 fractional-point game.

NASA Selects Garrett For Hypersonic Engine

NASA has selected Garrett Corp., Los Angeles, Cal., for negotiation of a contract to design and develop the engine for NASA's Hypersonic Research Engine Project.

The contract is for approximately \$15 million and calls for final design, development, construction testing of small research ramjet engines. The engine will have a design weight limitation of 800 pounds with dimensions compatible with mounting it beneath the aft fuselage of the X-15 No. 2 airplane.

Liquid hydrogen fuel is specified for the research engine which must be capable of operating at flight speeds between Mach 3.0 and 8.0 (2,000 to 5,000 miles per hour). Mach 1 is the speed of sound.

The contractor will be required to deliver the first flight

engine to NASA within 29 months.

The ramjet engine differs from current aircraft engines, such as the turbojet, in that there are no rotating parts. It must be in motion through the air to begin operation. Operation depends on air being rammed into the inlet. Fuel is introduced into the internal air flow to add energy through combustion. The expanded gases are released through a nozzle to provide thrust.

Stage Bursts In Final Test Of Apollo 203

The final test in the Apollo/Saturn 203 mission was successfully completed at the end of the vehicle's fourth orbit over Corpus Christi, Texas, at approximately 4:11 pm CST July 5. It terminated in the destruction of the second stage.

The test was an experiment to measure the rate of pressure rise in the partially filled liquid hydrogen tank. Starting at the end of the third orbit, liquid oxygen was vented and the liquid hydrogen continuous venting was stopped.

At the end of the fourth orbit, liquid hydrogen pressure was 38 pounds per square inch and liquid oxygen pressure was four pounds per square inch. It was determined later that the stage had burst as expected. The stage was in a 111-nautical mile geocentric orbit at break up, and pieces were expected to reenter within two weeks.

The Saturn 203 was launched from Cape Kennedy at 9:53 am CST, July 5. It comprised two rocket stages, the S1B and the S1VB. The latter stage was the one which went into orbit.

AMU Manager Speaks to ISA July 27 Meet

W. C. McMillin, Ling-Temco-Vought Aerospace Corporation program manager for the Astronaut Maneuvering Unit (AMU), will be the featured speaker at the July 27 meeting of the Apollo Section of the Instrument Society of America.

McMillin will describe the AMU's systems, instrumentation and developmental history and will show training films of the unit in operation. The AMU was to have been used on Gemini IX and is scheduled for Gemini XII.

Non-ISA members are welcome to attend the meeting, which begins with cocktails at 6:15 pm, dinner (\$3.25/person) at 7:15 and the meeting at 8 pm. For reservations or information call Lawrence Lockwood at HU 8-0850, Ext. 332.



Six Experiments Tentatively Picked For 1969 Mariner Mars Fly-Bys

NASA has tentatively selected six experiments to be carried on the two Mariner Mars spacecraft scheduled for launch during the period extending from early-February to mid-April 1969.

They are:

- Two television cameras
- Infrared spectrometer
- Infrared radiometer
- Ultraviolet spectrometer
- Celestial mechanics experiment
- S-Band occultation experiment

These experiments were selected to extend knowledge of the Martian atmosphere, the visible features of the Martian terrain and to gather additional data to continue planning for landing instrumented spacecraft on the planet.

Each 1969 Mariner spacecraft will weigh 800 pounds and will be launched by an Atlas-Centaur from Cape Kennedy, Fla. The Mars encounter will take place in late August or early September when the spacecraft are expected to fly by the planet at an altitude of about 2000 miles.

The Jet Propulsion Laboratory, Pasadena, Calif., has been

assigned project management responsibility for the Mariner Mars '69 missions.

Following are details on the six experiments:

Television

Two television cameras will take both high-and low-resolution pictures of Mars surface features during the period when the spacecraft is nearest to the planet.

It is expected that pictures will be obtained showing features measuring 500 feet or more. This is about ten times the resolution of the pictures received from Mariner IV in 1965.

The photographs will be used to provide knowledge of the general exterior features of the planet including geologic history such as evidence of change in the shape of craters.

The principal investigator is Professor Robert B. Leighton, California Institute of Technology, Pasadena, Cal.

Infrared Spectrometer

Using a spectrometer, the investigators will measure the infrared spectrum of Mars in the 2.5-15 micron range.

The instrument will pick up reflected solar radiation and thermal emission from the planetary surface as it passes through the atmosphere.

These data are expected to reveal information on atmospheric constituents such as carbon dioxide, hydrogen and oxygen as well as surface composition, temperatures and atmospheric photochemistry.

Principal investigator is Professor George C. Pimentel, University of California, Berkeley.

Infrared Radiometer

By measuring surface temperatures with a two-channel infrared radiometer the investigators will attempt to determine the temperature of individual areas on the surface of Mars. The measurements will be carried out over the same areas covered by the TV experiment for correlation with visible features.

The radiometer will measure the power delivered by planetary radiation in the wavelength ranges 8 to 12 and 18 to 25 microns.

Principal investigator is Professor G. Neugebauer, California Institute of Technology, Pasadena.

Ultraviolet Spectrometer

Ultraviolet radiation from the upper atmosphere of the planet will be measured. The instrument used will measure wavelengths in the 100 to 4500 angstrom spectral range.

Investigators wish to identify and measure the distribution of atoms and molecules in the Martian atmosphere of such constituents as oxygen, hydrogen and nitrogen. In addition the instrumentation is aimed at estimating the pressure and scale height of the lower atmosphere and the amount of ultraviolet radiation striking the surface.

Principal investigator is Professor Charles A. Barth, University of Colorado, Boulder.

Celestial Mechanics

Through analysis of tracking data of Mariner IV and Mariner Mars 69 the investigator expects to improve knowledge of the masses of Mars and the Moon, the astronomical unit (distance from Earth to the Sun), and the precise orbits of Earth and Mars.

John D. Anderson, Jet Propulsion Laboratory, Pasadena, is the principal investigator.

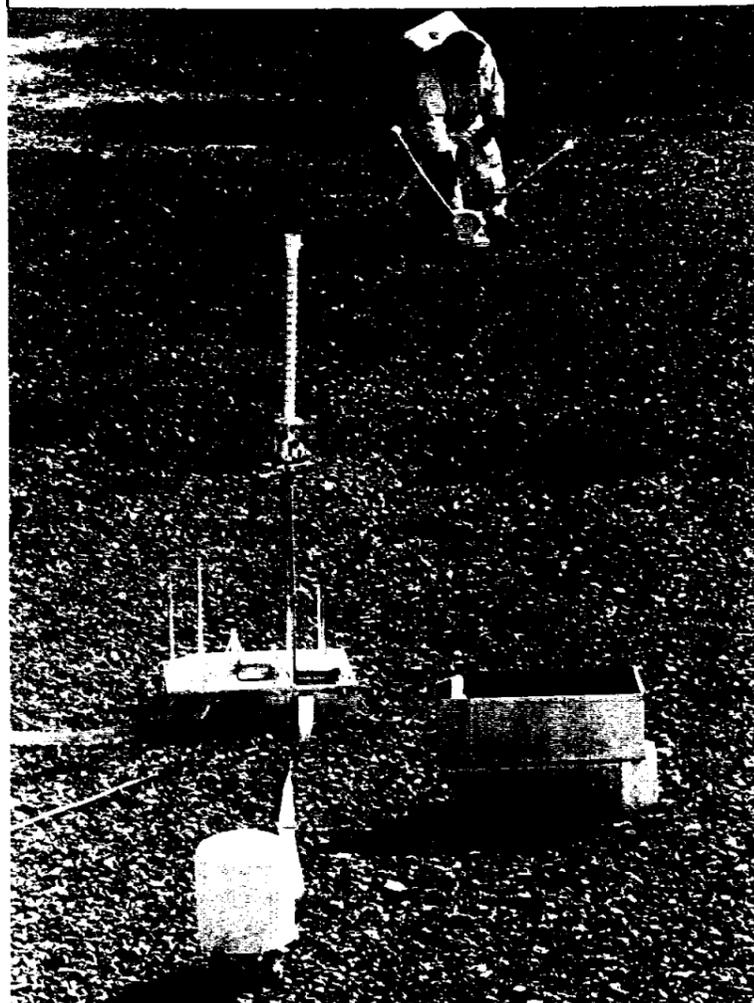
S-Band Occultation

As the spacecraft passes behind Mars, changes in frequency, phase and amplitude of the S-Band tracking and telemetry signal immediately prior to and following occultation is expected to yield significant data on the Martian atmosphere.

As a result, further information would be gained on density, extent and composition of the ionosphere; and the radius and physical oblateness of the planet.

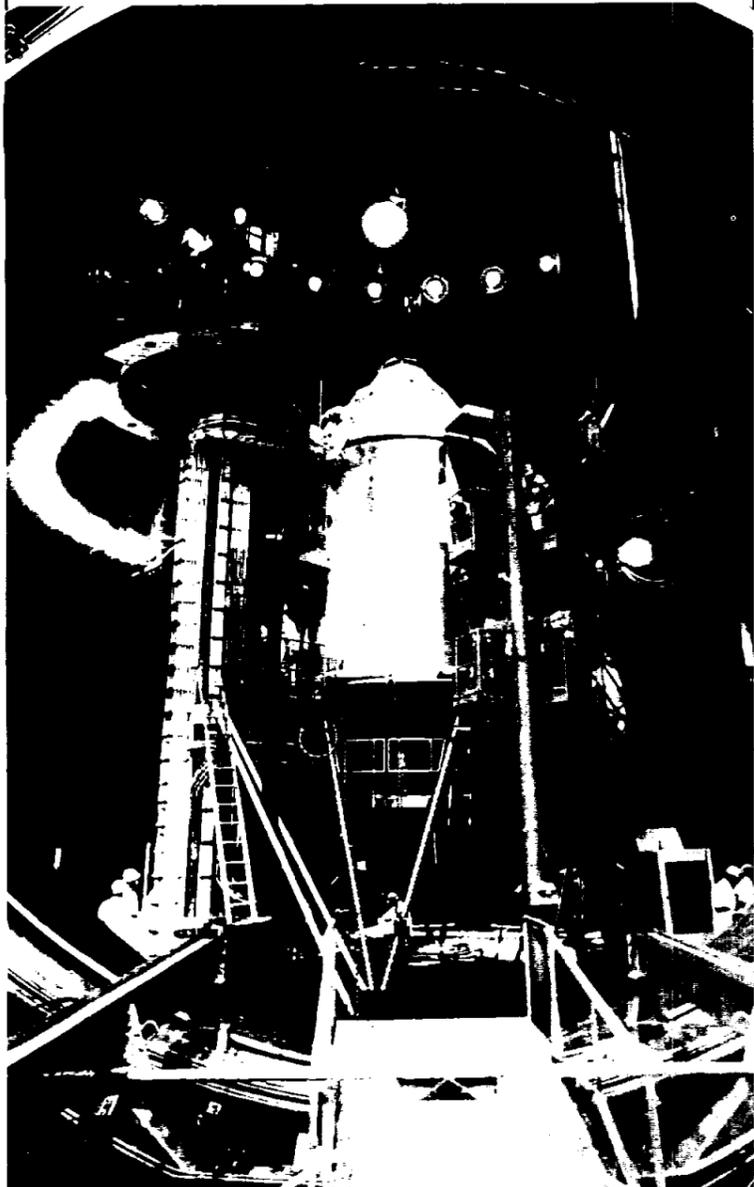
Principal investigator is Dr. Arvydas J. Kliore, Jet Propulsion Laboratory, Pasadena.

Lunar Exploration Rehearsal



FEELING THE MOON'S PULSE—Bendix technician Ron Reddick places components of the Apollo Lunar Surface Experiments Package (ALSEP) in position near the full-scale Lunar Module mockup on MSC Lunar Topographic Area. In the foreground is a passive seismometer; the data subsystem sits immediately behind, and Reddick deploys arms of the magnetometer. Bendix is contractor to MSC for the ALSEP. The system is designed to transmit back to earth geophysical and environmental data for a period of one year after Lunar Module liftoff.

Readying for a Wring-Out



TORTURE CHAMBER—Apollo spacecraft command and service modules 008 are almost obscured by work platforms and instrumentation cabling as they are prepared for extensive manned and unmanned testing in the 65-ft by 117-ft Chamber A of the Space Environment Simulation Facility in Bldg. 32. Command module 008 arrived at MSC from NAA-Downey on May 9 and service module 008 arrived May 5. Chamber A uses a combination of mechanical, diffusion and cryopumps to pump down to a vacuum of 1×10^{-5} torr (85 miles equivalent altitude) in 19 hours. Liquid nitrogen cold walls and solar simulators provide the extremes of temperature.

Masons Form Lodge

Masons of the MSC area have organized to form a new lodge. The officers will be seated in an open meeting in the MSC Auditorium on July 30 at 2 pm, by Brother H. W. Fullingim, the Most Worshipful Grand Master of Masons in Texas. Those interested in further information contact Tommy Tucker, HU 8-3300, Ext 398 or David Bell.

MSC Credit Union Provides Employee Financial Service

First drawing in the MSC Federal Credit Union's dinner-for-two contest will be held July 29 at 2 pm. Final drawing for a television set will be on September 30.

Employees sometimes ask, "What's the difference between doing business at the Credit Union or at some commercial financial institution?"

The answer to that question is that the employee is part owner in the Credit Union, and that the Credit Union is geared to provide the sound, practical financial services that he needs. Moreover, outside interests seeking big profits from the employee's financial needs are out of the picture. Therein lies the difference.

The MSC Federal Credit Union office hours are 10 am to 2 pm daily except Monday and Tuesday of pay-day week, when it is 10 am to 4:30 pm.

We get letters .

*Gimini Control
Houston, Texas*

For a rendezvous & walk-in-space mission, why not burn up an old booster, left in space from a previous mission? In other words, rendezvous with the object, attach a retro-rocket by a man in space, wait until the Gimini or Apollo spacecraft is out of range and fire the retro. Do this to get rid of the junk flying around out there.

Sincerely,

Jim F.

Coral Gables, Fla.

Dear Sirs:

I would like to obtain data and pictures taken by the Surveyor lunar craft, and also if possible, acquire information on the following:

(Series of questions; request for photos)

Please find enclosed my allowance for the week (\$5.50) to cover cost of pictures and postage.

Yours sincerely,

E. McA.

Wheeler AFB, Hawaii

P.S. - Please return change, if any, I need the money to buy a telescope.

EAA Sets 'Teen Dance In Kemah August 20

The MSC Employee Activities Association August 20 will sponsor a 'teen dance (age 13-20) at the Kemah Elks Club on FM-518 just west of Highway 146 from 8 to 12 pm.

Music for dancing will be by the "Runaways," who just completed an engagement with the Dave Clark Five. More details will appear in the *Roundup* and on MSC bulletin boards.



GEMINI IN A BOTTLE—Three Japanese youngsters hold a Gemini VIII orbital chart (top) that was included in material in a bottle heaved over the side of the tracking ship USNS Coastal Sentry during the mission. Bottom photo shows the contents of the bottle.

Fisherman Retrieves Ship's Bottled Message

The accepted practice for those stranded on deserted islands, has been to cast a bottled plea for help into the surf and wait.

Flight controllers aboard the *Coastal Sentry* tracking ship for the Gemini missions have been utilizing this method of communication for a slightly different purpose and have made a contact.

A letter and pictures of Japanese children with the contents of the bottled message put into the sea from the *Coastal Sentry* during the Gemini VIII flight, were received by James R. Fucci. Fucci was the spacecraft communicator onboard the *Coastal Sentry* during that mission.

The bottle and contents were put into the sea off the coast of Formosa just north of the Philippines, on March 16 of this year at Lat. 25°N. and Long. 125°E. The bottle was found 83 days later, on June 7, off the southern tip of Honshu, the main island of Japan at Lat. 34°N. and Long. 136°02'E., near Mikiura Point and the city of Owase.

Father Takao Yamashita, an American priest at a church in Japan relates the find in the letter that follows.

Dear Mr. Fucci,

It's been found!! Don't you remember? The date, March 16, 1966, the Gemini VIII flight. The place . . . aboard the USNS Coastal Sentry off the coast of Formosa. THE GLASS JUG . . . with the American flag sticking out of the top . . . the contents being various names and addresses, space research photos and magazines.

A fisherman was making his way home in his boat on June 7

and noticed an unusual glass jug bobbing near the rugged coastline. He stopped and fished it out and brought it home. It became the center of attraction. The glass had to be broken to get at the contents.

The semi-soggy contents proved too much for them. The finder's younger brother, a senior in high school and some of his buddies, all eager beavers of the English tongue went to work. The going got too rough for them so they brought the contents to me, an American priest at the local church.

According to the boys, the stuff fell out of the Gemini spacecraft. I was a bit hesitant at handling the stuff, not being of a scientific bent and the ionosphere and such like hold mysterious and maybe injurious radioactive rays, etc. . . . so I feared. Luckily I'm farsighted so perused the contents at a distance and came to the right conclusion (I think). I hated to disillusion the lads but truth must out.

We are all excited about the find and we hope to hear from you all in the very near future.

Sincerely yours,

Rev. Takao Yamashita

A similar bottle, deployed on March 23, 1965, during the Gemini III mission, from the same ship, only in the Indian Ocean, was found off the West Coast of Australia about 2½ months later during the Gemini IV flight in June 1965.

The flight controllers on the *Coastal Sentry*, have placed similar bottles into the sea on all of the manned Gemini missions and these are the only two known recoveries.

WITH GLIDE-ANGLE OF A BRICK—

M2-F2 Lifting Body Completes Successful First Flight at FRC

NASA Research Test Pilot Milton Thompson July 12 successfully flew the M2-F2 wingless lifting body at the NASA Flight Research Center. Launched from a B-52 wing pylon from 45,000 feet, Thompson put the vehicle through its flight profile exactly as planned.

The 5000-pound craft glided earthward at 450 miles per hour as the pilot made a 90-degree left turn and a practice landing flare-out at 25,000 feet. Following a second 90-degree left turn, he was on the final approach leg and began his flare maneuver at 1200 feet. Airspeed dropped from 350 miles and hour to about 170 at touchdown, and the sinking speed dropped from 250 feet per second to 10 feet per second. Although the M2-F2 is equipped with four hydrogen peroxide thrusters totaling 1600 pounds thrust for extending the flare-out, the 40-year-old Thompson elected not to fire them on this first flight.

Launch to landing took about four minutes.

The purpose of the flight was to perform a complete design and systems checkout of the vehicle and evaluate vehicle stability and control. Wherever possible backup systems have been provided. The M2-F2 is equipped with a rocket-powered ejection seat for use at any speed or altitude and even while the vehicle still attached to the B-52 pylon.

The M2-F2 "heavyweight" lifting body is a heavier version of the plywood M2-F1 lifting body that was first flown by Thompson in August 1963. The M2-F1 was towed to an altitude of 12,000 feet by a C-47 aircraft

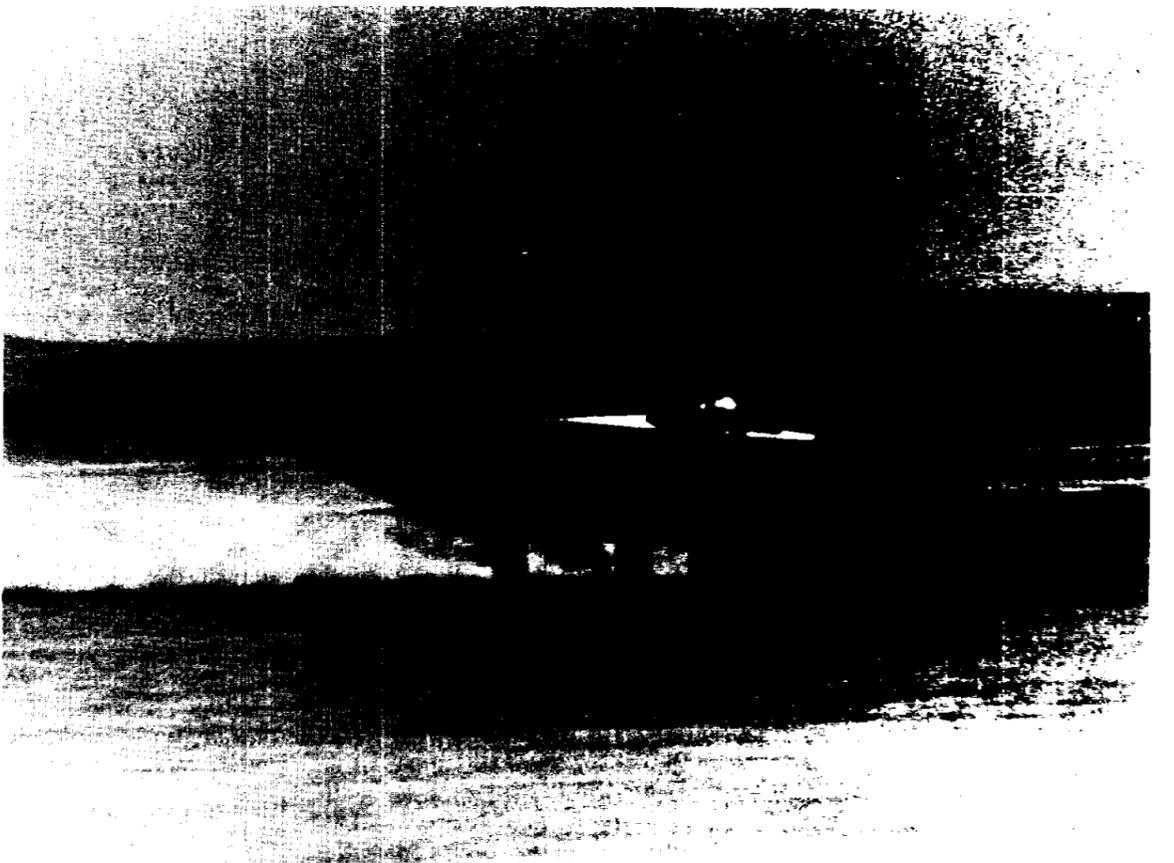
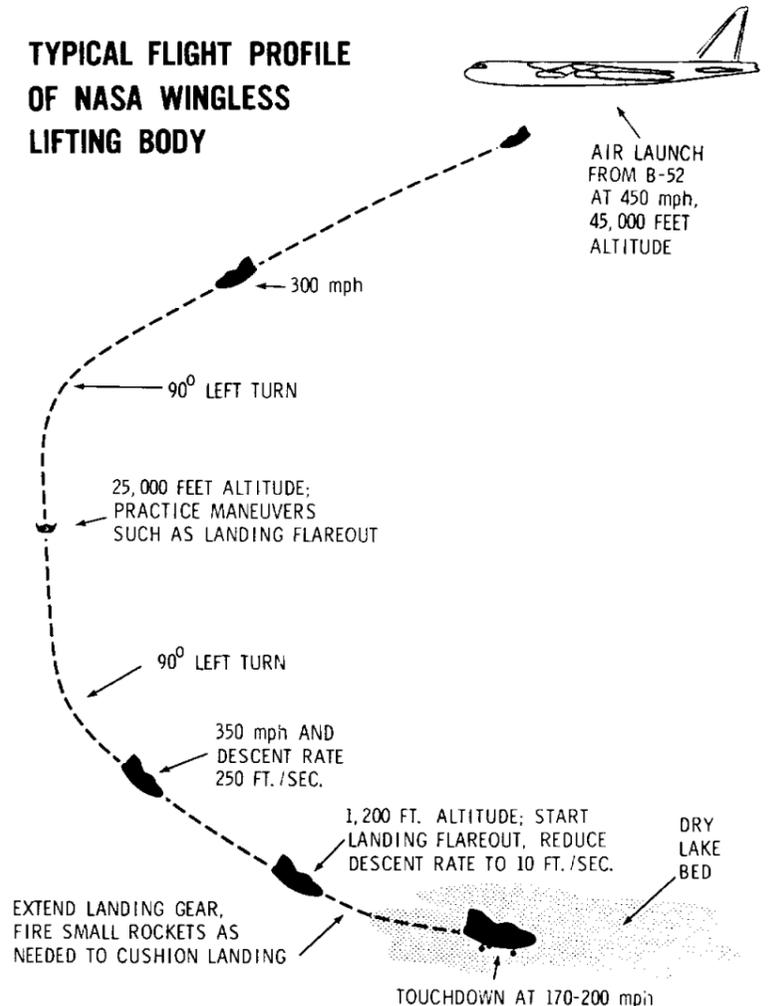
and released for free flight. Almost 100 aero tows of the M2-F1 have been made to date.

The lifting body concept is being investigated by the NASA Office of Advanced Research and technology to establish the technological base for future manned reentry vehicle design. The lifting body potential lies in greater aerodynamic lift-to-drag ratios (L/D) than the semi-ballistic water-landing manned spacecraft in present programs.



Test Pilot Milton Thompson

TYPICAL FLIGHT PROFILE OF NASA WINGLESS LIFTING BODY



TOUCHDOWN—The M2-F2 lifting body touches down at 170 mph on a dry lake at the NASA Flight Research Center following the successful first flight of the flatiron-shaped craft. The descent from release altitude of 45,000 feet took four minutes. The 5000-pound M2-F2 is 22 feet long and 9 feet 7 inches wide. Water ballast tanks can increase the weight to 9000 pounds.

'Coach' Garino Keeps Expert Eye On Flight Crew Physical Fitness



Workout scheduling . . .

Flying, whether it be in aircraft or spacecraft, demands that pilots be in the best of physical shape. The job of keeping MSC's spaceflight and aircraft crews in top physical shape falls upon the wiry shoulders of Joe S. Garino, physical training specialist assigned to the Astronaut Office.

Garino's place of business is the one-story Astronaut Physical Training Facility back in the trees on the northeast corner of the Center. The facility is equipped with gymnastic and weight-lifting equipment, squash and handball courts, and a half basketball court that doubles as a volleyball and badminton court. A stream room and whirlpool bath supplement the equipment for keeping muscles in proper tone.

Garino, a tech sergeant in the Air Force on detached service to MSC, first joined the Center back at Langley in November 1962. He was athletic NCO at the Langley AFB gymnasium and has been in the Air Force since 1951. Before joining the Air Force he was in the Navy and in the Army's 11th Airborne Division for a total military service of 18 years.

Practicing what he preaches, Garino is somewhat of an athlete himself. Besides being able to "press" quite a few pounds in

weightlifting, being a rated master parachutist and expert Scuba diver, Garino in 1961 was Langley AFB lightweight boxing champ, placed second in the middleweight category in the Tactical Air Command boxing tournament in 1960, and was All-Japan armed services lightweight champ in 1947.

Before the move from Langley, Garino trained several Technical Services Division employees in the use of Scuba equipment. Tech Services swimmers support spacecraft landing and flotation tests and flight crew water egress training exercises in Galveston Bay and in the Gulf.

Garino designs an individual gym workout program for each pilot, depending upon where his needs lie. The training stresses muscle toning and development of strength and stamina rather than building Charles Atlas physiques.

"Just plain old running," said Garino, "does as much for the stomach as anything. Some of these guys can run for miles without tiring."

Once the pilot's workout program has been set up, the pilot comes to the gym during the lunch period or after work to do his daily workout. When assigned to a mission, a pilot continues his workout program in a compact gym in the crew quarters at Kennedy Space Center right up to the day before launch.

"The guys drink a lot of juice after workouts," said Garino as he loaded cans of juice concentrate into a refrigerator. "And a lot of them come down here and have just a can of diet liquid for lunch." Garino buys the juice and diet liquid and bills the pilots for what they use.

In addition to his physical training duties, Garino procures and maintains crew equipment for aircraft flights, such as helmets, boots and coveralls. Working with a garment manufacturer, Garino designed the blue flight coveralls used by MSC pilots at a cost almost half that of the standard-issue service coveralls.

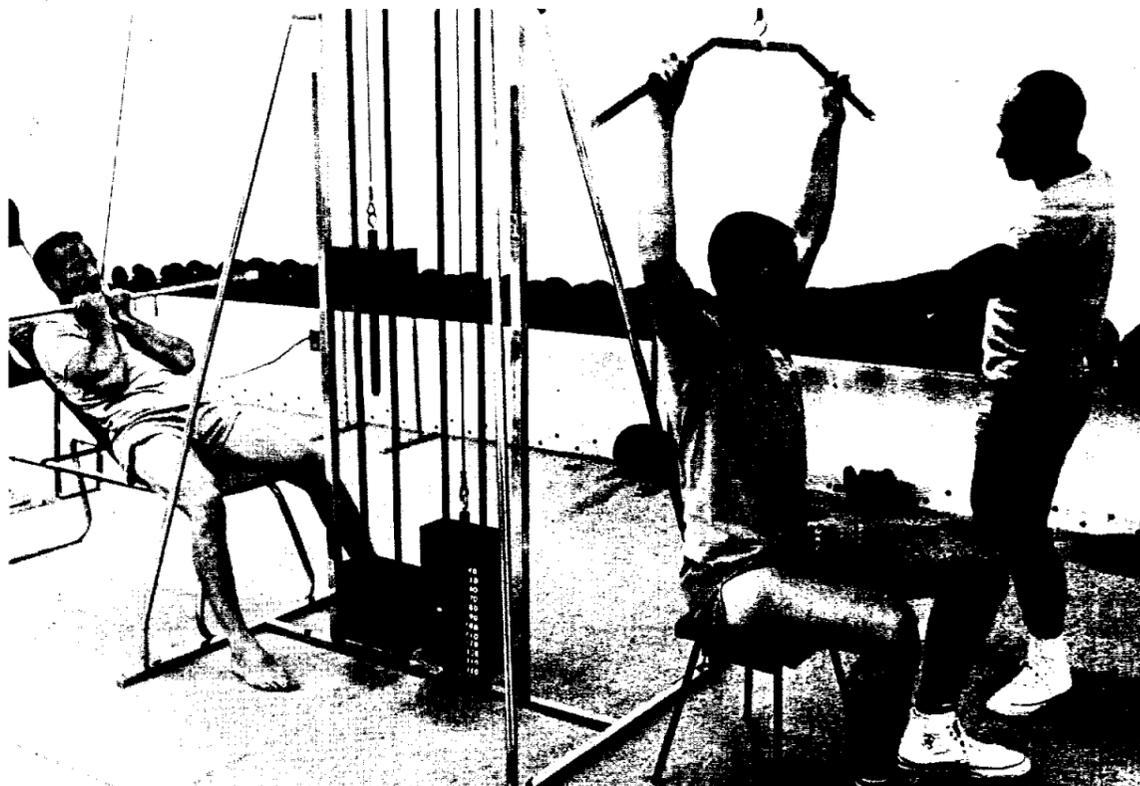
Garino was born in Kailua, Hawaii. One Sunday morning when he was 13, Garino was on his way to a basketball game at the Navy submarine base at Pearl Harbor when the dive bombers with "meatballs" on their wings attacked the installation. "A Marine told me to take cover in a large joint of concrete pipe lying alongside the road. I stayed there from nine in the morning until after dark without anything to eat or drink," Garino recalled. "Bullets would ricochet off the outside of the pipe. I've got to admit I was a bit scared. Finally, someone spotted me in the pipe and told me to come out."

Garino lives in Houston with his wife, 12-year-old twin daughters and two-year-old son. His main hobby interest is power boat racing.

During the Houston Oilers' home football games, Garino since 1962 has been an unpaid assistant to the Oilers trainer Bobby Brown. "I sort of 'pick' Bobby's brains for good training pointers that I can use in my work here—plus it's just a lot of fun," said Garino.



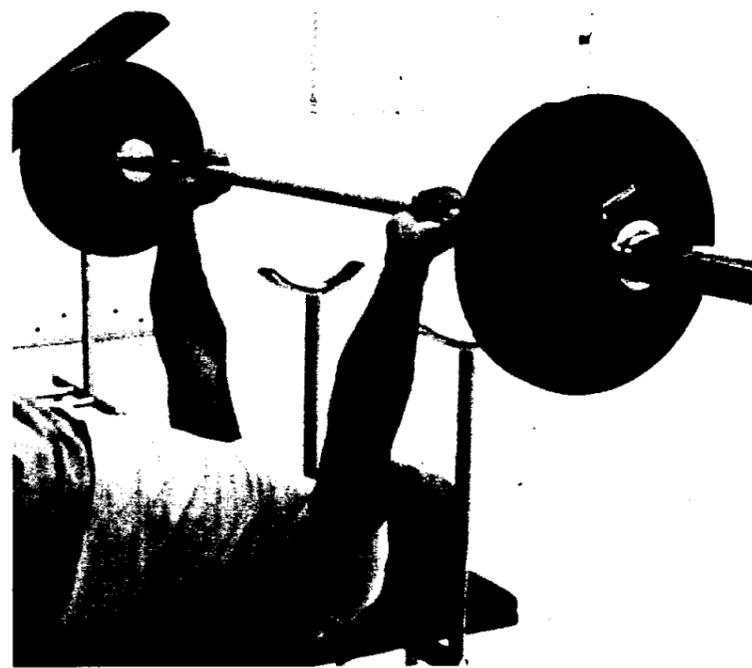
keeping the refrigerator stocked . . .



giving pointers on muscle-toning workouts . . .



a few fast games of handball . . .



and a 200-pound "press" are all in a day's work for Joe Garino.

The SPACE NEWS ROUNDUP, an official publication of the Manned Spacecraft Center, National Aeronautics and Space Administration, Houston, Texas, is published for MSC personnel by the Public Affairs Office.

Director Dr. Robert R. Gilruth
Public Affairs Officer Paul Haney
Editor Terry White
Staff Photographer A. "Pat" Patnesky

Female Frustrations

(Among the more articulate missives received by the Roundup is this unsigned protest against MSC's sidewalk system by a fashion-conscious young lady in the Instrumentation and Electronic Systems Division)

We as employees of MSC are extremely proud of our attractive, new facilities. The shining campus-looking complex is indeed a great feat of engineering. However, at least one group at the Center is well aware of the penalties of beauty. This group encompasses the majority of females employed here.

Since the first office was occupied at the new site, underground rumblings have been heard about the windy location, the distant parking facilities, and, primarily, the attractive shoe-destructive pea-gravel sidewalks. The number of replaced heel taps must now resemble the figure of the national debt.

Now with summer and hot weather upon us, we are faced with a new dilemma. The tar used as expansion seams on sidewalks is equally detrimental to the fashion-conscious female. It is seemingly impossible to walk without having a tiny heel pierce through the hot tar. From there the tar is transferred to tiles, carpets, chairs,

and yes—even clothes. A tiny glob of this sticky, black stuff can cover wide surfaces.

To the practical male species, no problem exists. He simply says, "Can't you walk without hitting a crack?"

However, he has never tried to maneuver a high-heeled, pointed-toe, all-fashionable shoe of today's well-dressed female.

We, the less practical fashion-conscious female, say "Help!" Can't something be done or shall we take the problem into our own incapable hands and appear in our offices shod for mountain climbing and let fashion be forgotten?

(Perhaps the sidewalks are retaliating for the punishment received from spike heels; a 115-pound girl wearing 3/8"-diameter spike heels impacts a composition tile floor or a concrete sidewalk at more than a thousand pounds per square inch during that moment when her entire weight is borne by one heel. And spike heels are death on teak decks. Editor)

Cultural Group Needs Support

A free concert by the Houston Summer Symphony July 8 at the Sylvan Beach Pavillion, and attended by many MSC employees, marked the birth of a group dedicated to bringing more such cultural events to the MSC area.

The non-profit Bay Area Fine Arts Association was formed to stimulate and encourage interest in the fine arts at the community level through amateur theater, orchestral and choral groups, as well as by cooperating and supporting such groups already in operation. A second Association purpose is to bring in more professional talent for local performances.

The Association will serve as a clearing house for dates of all Bay area events to avoid scheduling conflicts. On the Association's board of trustees are Mrs. Joseph Shea and Mrs. Lawrence Birdsong, both wives of MSC employees. Mrs. Charles Conrad and Mrs. James Lovell are honorary trustees.

Although the Association was originated by the LaPorte Chamber of Commerce Cultural Development Committee, membership is open to all Bay-area residents.

MSC employees who appreciate or would like to participate in fine arts activities are asked to fill out an Association informa-

tion card and spell out what types of cultural entertainment are desired. Clarke Hackler at 2237 is the Association contact at MSC.

OUT OF TEXAS' PAST

Sculptor Elisabet Ney Found Exile Within Exile in Texas

Fifty miles northwest of Houston, just off US 290, lies Liendo, Victorian plantation home of this state's greatest artist, glamorous Elisabet Ney, the tragic beauty whose name was linked with royalty in scandals that once rocked Europe.

Those heroic statues of Houston and Austin that stand just inside the main entrance of the Capitol Building in Austin are the best-known Ney works in Texas. Other American works of hers are in a museum in Austin that once was her studio. And somewhere in Europe are her earlier works, including busts of Schopenhauer, Garibaldi, Bismarck, Humboldt, King George V of Hanover and King William

I of Prussia and a statue of William II.

One of many smears with which Texas tormented this great woman linked her name with that of King William. Yet even a casual study of her life indicates that she loved only one man, Edmund Montgomery, the Scottish biologist whom she married when he was a medical student, in 1863, before the Prussian period.

Curiously, it was politics that drove Elisabet and her scientist husband out of Europe in 1870. Liendo, which they bought in 1872, already was a historic spot. General Custer had camped there during "Reconstruction," and Jared Groce had

worked 300 slaves in its cotton-fields.

Elisabet was an internationally celebrated artist and a descendant of Marshal Ney, while Edmund was a brilliant scientist and philosopher. At Liendo he pursued pioneer research in the structure of living cells, postulated an advanced theory that life resulted from interaction between intricate chemical elements and their environment, challenged the popular philosophical concepts of the day and published papers in learned journals of the United States, England and Germany.

But the people of Hempstead (three miles from Liendo) would have nothing to do with the couple, believing that they were living in sin because Elisabet Montgomery used her professional name, calling herself Miss Ney. And this in a period during which all Texas had a saying perpetuated in a phrase that survives to this day—that the three toughest places in the cosmos were Hearne, Hempstead and Hell!

Elisabet and Edmund endured the most humiliating ostracism by most of their fellow-Texans for almost 20 years. Their two children were born at Liendo, and when one died poor Elisabet cremated his body in a fireplace faced with Italian marble in a great parlor—preferring that to a public funeral.

According to local superstition, the ghost of little Artie, the cremated child, still wanders among the liveoaks, walnuts, catalpas and redbuds on the grounds by day and walks the halls of the big house, laughing in the night. Once the house had a room called "the Ghost Room," where the chests had hidden drawers and the bedposts contained secret compartments. Nearby was "the Ney Room," containing Artie's bassinet, Dr. Montgomery's bookcases, Elisabet's bathtub and a curious hard bed with a high back-rest. The artist often had to sleep sitting up because of an asthmatic condition said to have been (but probably not) caused by inhaling marble dust. Then there was "the Brides' Room," where all the daughters of a former owner spent their wedding nights.

In 1893 Elisabet was commissioned to execute the statues of Houston and Austin for display at the Columbian Exposition, in Chicago. She moved to Austin and lived in her studio until her death in 1907, leaving behind many important works, including a sculpture of a sleepwalking Lady Macbeth. Two months after his wife's death, Dr. Montgomery had an attack of "apoplexy," from which he never recovered.

Elisabet, Edmund and Artie were buried at Liendo. The Montgomery library, including the doctor's papers, was given to Southern Methodist University.

— Sigman Byrd

Space News Of Five Years Ago

July 22, 1961—Astronaut Virgil Grissom, pilot of the MR-4 Liberty Bell 7 was awarded the NASA Distinguished Service Medal by NASA Administrator James Webb at the conclusion of the MR-4 press conference held at Cape Canaveral.

July 23, 1961—Central Aero Club of the USSR, in seeking to place Gagarin's flight in the record books, revealed to FAI Astronautics Documentation Subcommittee, meeting in Paris, that Gagarin rode his spacecraft to earth rather than parachuting.

July 27-28, 1961—After the two-man space concept (later designated Project Gemini) was introduced in May, 1961 a briefing between McDonnell and NASA personnel was held on the matter. As result of this meeting, space flight design effort was concentrated on the 18-orbit one-man Mercury and on a two-man spacecraft capable of advanced missions.

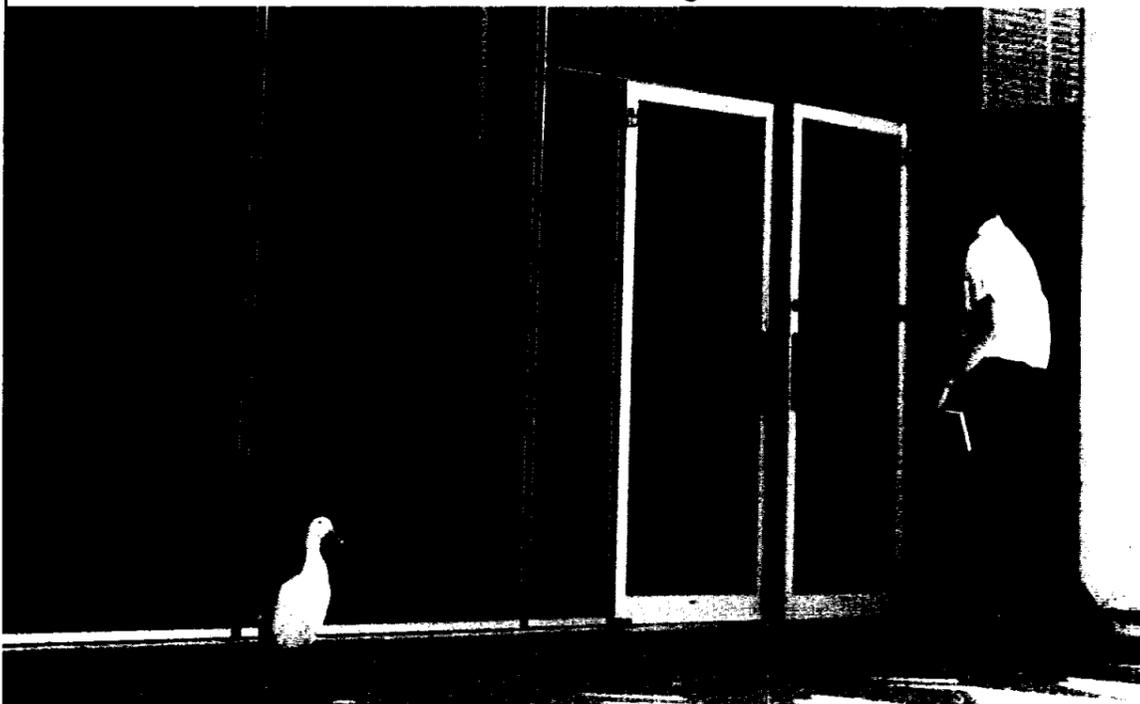
July 28, 1961—NASA invited 12 companies to submit prime contractor proposals for the manned lunar Apollo spacecraft by October 9.

Interviewed in the Netherlands West Indies, en route to Brazil, Maj. Yuri Gagarin said that his next assignment would be a flight to the moon. Asked about US efforts, he reportedly stated that "there is a place on the moon for everybody."

July 31, 1961—Between this date and September 15, 1961 the astronaut centrifuge training program at the Aviation Medical Acceleration Laboratory was directed entirely toward the Mercury-Atlas orbital missions.

August 1-3, 1961—Seaworthiness characteristics of the operational Mercury spacecraft were evaluated. Conditions during the test varied from ground swells of five to 15 feet, wave heights of two to 10 feet, and winds six to 20 knots. The test lasted for 33 hours and was quite successful.

Feathered Vigil



PEOPLE WATCHER—A snow-white member of MSC's large duck population has maintained a vigil for several days at the entrance to Mission Control Center as if waiting for a mate he (or she) thought had disappeared into the building. Peanuts and other tidbits of foods that ducks are assumed to like were fed the web-footed critter by employees in the building. Perhaps the duck was seeking sanctuary from the July heat, but at last check he was still manning . . . er, ducking his post.

Picnic Planned for October 1

Plans are well under way for the Fourth Annual MSC Picnic in Galveston County Park Saturday, October 1. Activities and games for children and adults are planned.

In addition to athletic events and water sports there will be

Management Society Honors MSC Employee

Lynda Plachy, summer employee in the MSC Educational Programs and Services Branch of the Public Affairs Office, was named "Outstanding Business Student of 1966" by the Houston Chapter of the Administrative Management Society.

Lynda, a Jefferson Davis high school senior, was presented an electric portable typewriter by Chapter President Earl C. Lairson and guest speaker US Senator John G. Tower at the Chapter's annual Education Night banquet.

Business students from 15 Houston senior high schools, along with commercial teachers and principals, were honored at the banquet.

live music for dancing in an open-air pavilion.

Picnic Committee officers are Evon Collins, chairman, Tony Yeater, co-chairman and Marilyn Bocking, secretary. Any employee interested in helping the Committee get all the many chores done that go into planning the picnic are invited to volunteer by calling a Committee member.

25-Year Award



Jack A. Jones
Flight Safety Office

Lunarfans Prowl In Canyon Lake On Second Trip

Members of the MSC Lunarfans Scuba diving club returned to Canyon Lake near New Braunfels on the July Fourth weekend for further exploration of the lake's subsurface area. Aided by recently acquired topographic charts of the area, diving teams were able to locate sections of the original beds 100 feet below the surface.

Other interesting items found by Lunarfans divers were bridges, caves and the remains of houses that occupied the river bank before Canyon dam was completed. Relatively clear water provided 25 feet visibility to divers about the 80-foot depth, but lack of sunlight below 100 feet obscured most objects.

The Lunarfans are continuing their weekend trips in the Gulf for spearfishing with exceptional results. Gulf waters on most of the trips have been calm, with visibility at the 30 mile oil rigs on several occasions being 40 feet. These trips always produce a boatload of fish, with the largest single catches being barracuda and ling in the 30-pound class.

Several Lunarfans members will attend the national convention of the Underwater Society in Miami the end of this month and hope to return with topics of interest for Lunarfans meetings as well as underwater films from side trips to the Florida Keys.

At the last Lunarfans meeting, members viewed film studies on shark behavior and oceanographic research.

Lunarfans meet the third Wednesday of each month at Ellington AFB.

Talent Being Scouted For Fall Variety Show

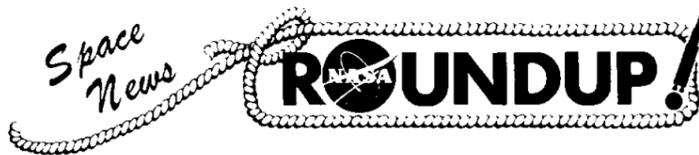
Banjo plunkers, folksong singers, soft-shoe dancers and other amateur entertainers who earn their living in the space business instead of show business are urged to begin tuning up for an MSC Variety Show to be held in the MSC Auditorium in late September or early October.

All types of talent are needed. Juanita Bower at 2737 is scouting for said talent.

EAA Club Meeting Schedule

Clubs listed below are sponsored by the MSC Employee Activities Association and are open to all MSC employees, their families, and to MSC contractor employees. Contact the groups of your interest or Hugh Scott at Ext. 4655 for additional information.

Club	Contact - Ext.	Meeting Time/Place
Barber Shop Quartet	Bill Drews 4777	Each Thurs. 7:30 pm Bldg. 1
Bridge	Leona Kempanien 5339	Each Tues. 8:15 pm Bldg. 336 EAFB
Charm Flying	Bea Anderson 3761 Don Bray 4766	To be announced 2nd Tues each month NB Bldg. 6
Golf	John E. Jones 4316	To be announced
Judo	Don Bray 4766	Each Tues & Thurs 5:30 pm
Radio Control Airplane	Bill McCarty 4546	Clear Lake Community Center 1st Tues each month 5 pm Rm 258 Bldg. 4
Sailing	Jerry Grayson 2983	To be announced
Scuba Diving	Chet McCollough 4546	3rd Wed each month 7:30 pm Bldg. 336 EAFB
Singleton Toastmasters	Gloria Haywood 5240 Ernie Gillam 7716	To be announced 1st & 3rd Wed each month 6 pm Kings Inn



MANNED SPACECRAFT CENTER, HOUSTON, TEXAS EMPLOYEE NEWS

20-Year Service Awards



Nelvin B. McGennis
GPO-St. Louis



John R. Mullins
Flight Safety Office



John R. Williams
Public Affairs Office



Warren J. Wood
Flight Safety Office

Aero Club Votes On New Aircraft

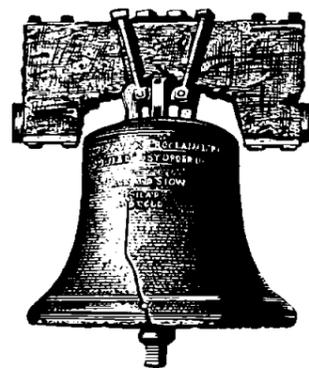
Members of the MSC Aero Club at the last meeting voted to buy a new four-place aircraft. A committee was named to present final studies for the make and model to be bought.

The final draft of the new proposed Club constitution will be presented by the constitution committee at the July 26 meeting in the MSC News Center Auditorium at 5:15 pm. All Aero Club members are urged to attend this special open meeting to vote on the aircraft and the new constitution.

The private pilots' ground school continues on Tuesday nights in the MSC News Center. The fixed-base operator selected for the flying portion of the course will be announced in the August 5 issue of the *Roundup*.

The first session of instrument ground school will take place in the MSC News Center July 28 at 5:15 pm. Training officer Sal Tripoli at HU 8-3300 has details of the instrument course.

Keep freedom
in your future



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Roundup Swap-Shop

(Deadline for classified ads is the Friday preceding Roundup publication date. Ads received after the deadline will be run in the next following issue. Send ads in writing to Roundup Editor, AP3. Ads will not be repeated unless requested. Use name and home telephone number.)

FOR SALE

Lotus 7 spares for many engines. Pair of 1 1/2" SU carbs, Volvo w/ford-Lotus manifolds and linkage \$35. (Healey, TR, etc) Coxworth A-111 billet cam \$40. Stock Anglia 105-E gearbox \$35 complete. Jan Farbman, WA 6-7192 or RI 7-3435.

3-bdr 2-bath brick in Sun Valley addition, 2-car garage, utility room, established neighborhood. \$17,500 or equity and 5/4% GI loan. B. French, HU 6-7203.

3-bdr 2-bath brick colonial in El Lago, air conditioned, landscaped, GE built-ins. \$23,400 or equity and assume \$110/mo payments. Frank Samonski, 877-4795.

Japanese shoji screen, teak, 6 panels, sunburst pattern, may be used as room divider, \$125. Set bronze flatware service for 12, many xtra pieces—candle holders, cream and sugar, salt and pepper shakers, serving pieces—includes 3-drawer chest. New—Must see to appreciate, \$325. Violin in fair condition—make offer. P. Boyd, GR 2-5681 after 5:30.

17-ft fiberglass boat, 40-hp Johnson motor, trailer, complete canvas and side curtains, xtra wide and deep, xceptional freeboard. \$850. Ken Turner, 977-4294.

Lot in El Lago, 120x150 plus easements, partially wooded, unobstructed view Taylor Lake, across street from boat ramp. \$8500. Ken Turner, 877-4294.

Danish modern occasional chair, upright vacuum cleaner, electric heater—all in xclnt condition. Wade D. Darland, 591-2105.

1962 Pontiac Grand Prix fully equipped, \$900. 2-bdr house on acre lot in Friendswood. Edith A. Linson, HU 2-7388.

3x6 top carrier for station wagon, chrome frame with wooden slat base, good condition. Cost \$25 new; sell for \$10. Joe Harris, HU 4-2131.

Formica dinette, 4 chairs, one leaf, \$35. Under-counter coppertone dishwasher, \$50. Jack Hartung, 877-1284.

4-bdr 2-bath brick, 2600 sq ft, in Clear Lake City, 2-car garage, central heat/air, wall-to-wall carpet, large den with built-in bookcase, 10x20 rear patio, part fenced, many xtras. Includes GE 16-ft refrigerator, washer/dryer, upright freezer, dishwasher, garbage disposal, wood/gas fireplace. Will sell or rent furn or unfurn, immediate occupancy. Mel Feldman, HU 8-2304.

3-bdr 2-bath 2400 sq ft brick in Wildwood/Seabrook, fireplace, air conditioned, all built-ins, refrigerator, detached 2-car garage, fenced, wooded lot. \$22,000. Lori Steinhardt, HA 4-3300.

Like-new Sunfish sailboat, seafoam green, 13 feet long. \$375. Bob Jones, MI 4-4036.

1960 Pontiac Star Chief 4-door sedan, power brakes/steering, radio, air, good tires and engine. Asking \$595. Vance Jones, HU 4-1321.

National NCX-3, NCX-A power supply, Adcom 250 mobile power supply and antenna, 55-ft tower, TH-4 beam and rotor, 1-kw amplifier, all cables, accessories. Mike Thoma, GR 1-2976.

3-bdr 2-bath 1980-sq ft brick, 2 years old, air conditioned, patio, many built-ins, landscaped wooded lot, close to park and new school, 516 Shore Acres Blvd. Assume 6 1/4% loan. Maj. Kenneth G. Martin, GR 1-4241.

Signature washer and dryer, 6-months old. Together \$250; separately \$130 each. Signature Frostproof refrigerator, almost new, \$150. AKC silver miniature poodle, 10 weeks old, good bloodline. Kay Marsh, 534-2075.

Fold-out tent camper, sleeps six, Sears 1964 model, good condition. Allen Groda, 826 Bayridge Road, LaPorte, GR 1-1221.

3-bdr 2-bath, central heat/air, panelled den, hdwd floors, fenced, half of 2-car garage made into study, Park View Manor. A. G. Willis, Jr., 2811 Huckleberry Lane, Pasadena, HU 6-5076.

3-bdr 2-bath 2-car garage, across from San Jacinto Junior College, built two months. Possession by August 1, \$700 equity, balance approx \$13,500. \$12/mo payments include taxes and ins. Jack E. Marion, 754 Lambuth Lane, GR 9-3313.

Contemporary walnut console home entertainment center. Emerson 23-in TV with AM/FM stereo and Garrard turntable, like new—one year old. Cost new \$450; sell for \$180. Al Watkins, 534-5427.

Keystone 8mm 3-lens turret movie camera w/elec eye; projector, splicer, light bar, cases. Like new, \$75. 35mm f/1.9 rfd camera with case and flash, \$40. Also Leica exp meter, Federal 269 enlarger, contact printer, tripod, filters, etc. Make offer. Al Watkins, 534-5427.

WANTED

Will pay up to \$25 for sofa-bed. Frank J. Blattner, HU 6-6623.

24-in boy's bike, Dean Thompson, HU 6-7768.

FOR RENT

3-bdr fully-furn vacation home in Fort Lauderdale, Fla., near beach. \$75/week. Special to NASA employees only. E. E. Horton, 877-4102.

Bay cottage 2 1/2 blks from Houston Yacht Club, \$125/mo. Lucy Keller, CA 8-7495 or JA 3-4789 after 5:30.

RIDER POOLS

Want in car pool or will pay, Freeway Manor/Sun Valley to Bldg. 4, 7:30 to 4. Dale Nussman, HU 6-0359.

Eleven Employees Earn PhD, Masters Degrees

Five MSC employees last month received their PhD degrees and an additional six employees received their Master of Science degrees under the MSC Graduate Study Program.

Degree recipients, their MSC assignments and these titles are as follows:

Dr. John Bertin, Aerospace Technologist, Thermal Technology Branch of Structures and Mechanics Division, received his PhD in Mechanical Engineering from Rice University. The title of his dissertation was *Text Time Limitation and Property Variations Induced by Thick Laminar Boundary Layer in a Circular Shock Tube*. Dr. Bertin joined MSC in May, 1962 as an aerospace engineer in the Aerodynamics Branch of Advanced Spacecraft Technology Division. He has done extensive analysis of the reentry convective heating environment of the Apollo command module. His activities include theoretical studies and all phases of wind tunnel test planning and analysis. He has authored several NASA papers and monitored a contractual study of aerothermodynamic phenomena associated with the reentry of manned spacecraft. Dr. Bertin received his BA and MS in Mechanical Engineering from Rice University.



Dr. Noel T. Willis, Thermal Technology Branch of Structures and Mechanics Division, also received his PhD degree in Mechanical Engineering from Rice University. The title of his dissertation was *Analysis of Three Fluid Cross-Flow Heat Exchangers*. Dr. Willis began his career with MSC in June 1964, as an Aerospace Technologist in the Aerodynamics Branch of Advanced Spacecraft Technology Division. As a specialist in gas dynamics and thermal analysis, Dr. Willis has conducted flow field investigations, analysis of special launch abort heating problems, command module calorimeter analysis and feasibility studies of sensors for unusual flight measurements of reentry aerothermodynamics. Dr. Willis also received his BA and MS in Mechanical Engineering from Rice.



Dr. J. M. Lewallen, Aerospace Technologist in the Theory and Analysis Branch, Computation and Analysis Division, received his PhD degree in Engineering Mechanics from the University of Texas. Dr. Lewallen's disser-



ertation was *An Analysis and Comparison of Several Trajectory Optimization Methods*. His work at MSC is closely related to this subject. His primary interest here is in research in astrodynamics and trajectory analysis as applied to Gemini and Apollo programs. Dr. Lewallen began his NASA career as a Research Engineer with Goddard Space Flight Center in July, 1960. He returned to the University of Texas to do graduate work in Engineering Mechanics and joined MSC in February, 1965. Dr. Lewallen also completed his BS and MS degrees at the University of Texas.

Dr. Kenneth J. Cox, Chief of the Systems Analysis Branch, Guidance and Control Division, received his PhD degree in Electrical Engineering from Rice University. He came to the Guidance and Control Division of MSC in June 1963. He and his Branch are responsible for doing Gemini and Apollo post-flight analysis. Some of their interests are the post-flight analysis of IMU operations; propulsion dynamics under zero-G operations; and RCS usage. Dr. Cox's thesis was *Multi-variable Systems with Interacting Controls*. Dr. Cox earned his BS and MS degrees in Electrical Engineering at the University of Texas.

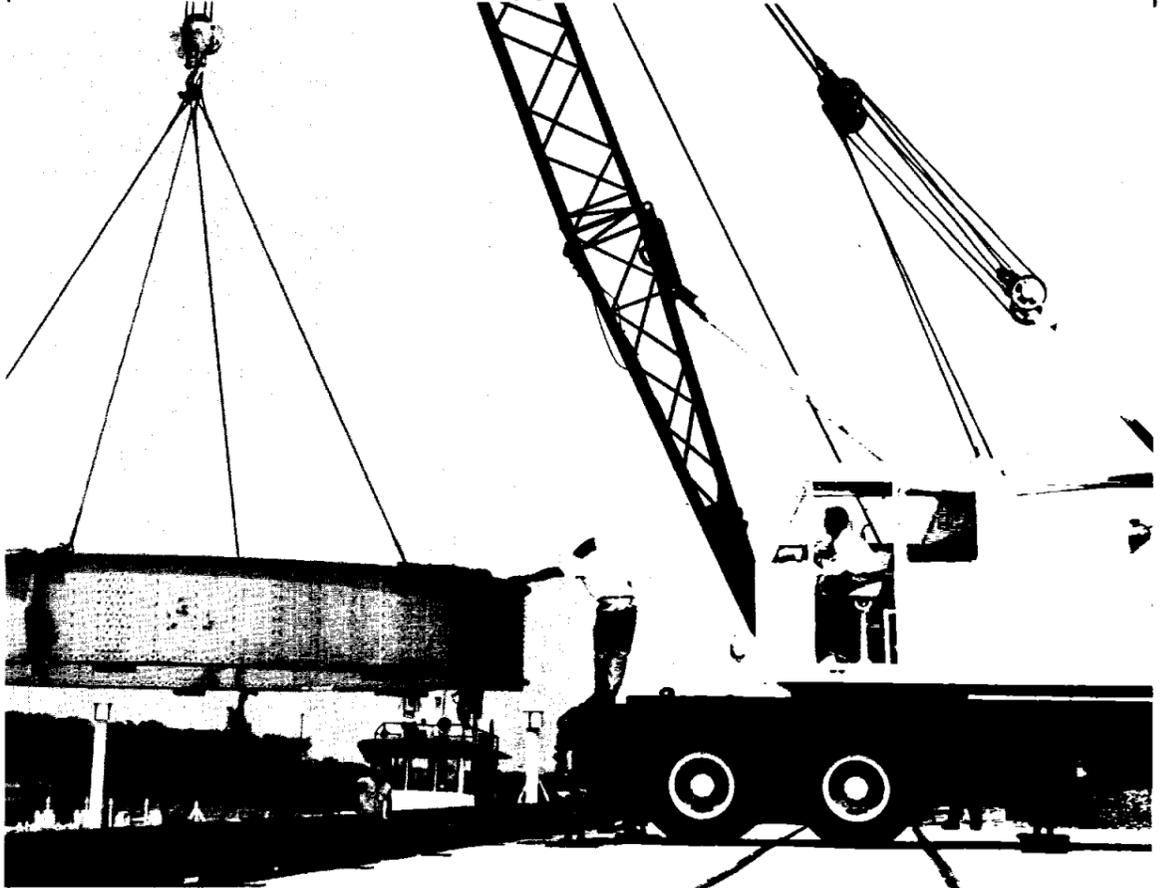


Dr. Fred J. Stebbins, Aerospace Technologist in the Structural Analysis Branch of Structures and Mechanics Division, earned his PhD in Civil Engineering (Structures) from Texas A & M University. Dr. Stebbins came to MSC in March, 1962. His dissertation was *Stiffness Matrix Solution for Shell of Revolution Possessing Variable-Thickness Heat Protection*. His responsibility in the Structural Analysis Branch is resolving the unusual and difficult indeterminate structural problems connected with the Gemini and Apollo spacecraft. His dissertation topic was based on specific research requirements related to the Apollo Program. Dr. Stebbins received his BS in Civil Engineering from Michigan State University and his MS in Structural Mechanics from Southern Methodist University.



In addition to these five employees who earned PhD degrees, six employees received Master of Science degrees in June. Dr. Clarence Jernigan received his masters degree in Public Health from Harvard University and will continue his studies at the US Air Force School of Aerospace Medicine at Brooks AFB, Texas. R. E. Holmes of the Crew Systems

First Bayport Customer



CARGO OFFLOADING—A 7500-pound 24-foot diameter adapter ring for an Apollo spacecraft vibro-acoustics test unit recently became the first cargo to be shipped through Bayport Channel when it arrived from Marshall Space Flight Center for delivery to MSC. Bayport Channel is operated by the Harris County Houston Ship Channel Navigation District. The 12-foot-deep 100-foot-wide channel ultimately will be dredged and expanded into a deepwater port.

Singletons Plan Outing At Freeport July 30

The MSC Singleton Club July 30 will hold a hot-dog roast at Freeport. Hot dogs, beer and soft drinks will be served. Tickets run \$1.25 each for members and \$1.75 for non-members. Gail Mauney at 7231 or Carol Teal at 3566 have ticket information.

Division received his MS in Mechanical Engineering from Rice University and has completed a portion of his PhD course requirement. Jan Martin, Information Systems Division, received his MS in Electrical Engineering from the University of Houston. Wendell Mendell, Space Sciences Division was granted a MS in Physics from the University of California at Los Angeles. Scott Morris, Computation and Analysis Division, received a MS in Math from the University of Houston and Don Norling, Advanced Spacecraft Technology Division received his MS in Electrical Engineering from the University of Houston.

In a recent letter, MSC Director Dr. Robert R. Gilruth congratulated all of these employees on their very significant achievements, and indicated his recognition of the importance of advanced study by MSC employees. All of those receiving degrees received at least partial support through the MSC Graduate Study Program and the cooperation of their immediate organizations. In many cases, research conducted for these and dissertation requirements applied directly to engineering problems associated with MSC projects.



Cones Replace C/SM In Saturn/LM Missions

A new Uprated Saturn I nose cone somewhat similar to the one flown on the AS-203 mission will be used on the later Apollo missions.

The NASA Office of Manned Space Flight has directed the NASA-Marshall Space Flight Center to fabricate three additional cones which are to be used on unmanned flights not involving the Apollo command and service modules.

Previously NASA had planned to use command and service module shells. These shells are larger and weigh some 7,200 pounds more than the cones. Immediately beneath the nose cone will be a lunar module adapter supplied by the NASA-Manned Spacecraft Center which will house the mission payload — an Apollo lunar module.

This new cone will weigh about 1,400 pounds and is made of aluminum. It will be 11 feet in height—six feet shorter than the one used on AS-203—and about 13 feet in diameter at the base where it connects with the lunar module adapter.

The new 25-degree cones will be made by the MSFC Manufacturing Engineering Laboratory following a design developed by the Center's Propulsion and Vehicle Engineering Lab.

Use of this new cone design instead of the entire Apollo module system shaves about 40

feet from the overall height of the space vehicle. The height will be about 180 feet instead of the 224 feet of the complete vehicle/Apollo spacecraft configuration.

Comsat Supports Apollo Missions With Satellites

NASA has signed an agreement with the Communications Satellite Corporation (Comsat) for satellite communications services to support the Apollo program.

Comsat will provide voice/data channels and teletype channels in synchronous satellites to be positioned for service over the Pacific and Atlantic Oceans.

The Atlantic Ocean Satellites will service communications stations at Grand Canary Islands, Ascension Island and two tracking ships located in the Atlantic and Indian Oceans. The Carnarvon, Australia, station and a tracking ship will be serviced by a Pacific Ocean satellite.

The cost of the services is estimated at \$8.95 million a year. These proposed rates are subject to approval by the Federal Communications Commission. Comsat filed its tariff requests with the FCC early this month.